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Knowledge level and clinical approaches of dentists in Turkiye on controlled extraction of poorly prognosed permanent first molars

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ABSTRACT

Aims: This pilot study aims to evaluate the level of knowledge and clinical approaches of general dentists and dentists with different specialties in Turkiye about the controlled extraction of young permanent first molars (PFM) with poor prognosis in children.

Methods: The survey study consisted of 23 questions measuring the demographic data of dentists, dentists' opinions and information needs about the controlled indications and extraction criteria of PFM teeth. The survey questions were administered online via Google Form on a voluntary basis. Shapiro Wilk's, Kolmogorov Simirnov and Kruskal-Wallis H tests were used for statistical analysis of the parameters.

Results: A total of 261 dentists participated in the present survey study, including 48 pediatric dentists, 11 orthodontists, 12 oral and maxillofacial surgeons, 34 dentists with a different specialty and 156 general dentists. 93.1% of the participants stated that they considered controlled extraction of PFM teeth in children at the ideal age range as a treatment method. The ratio of all dentists practicing controlled extraction as a treatment in children was 52.11%. It was observed that dentists, except pediatric dentists and orthodontists, had a low level of knowledge about compensation and balancing extractions. The average knowledge score was 6.08 (out of 9) in terms of the answers given to the questions regarding the level of knowledge. Pediatric dentists and orthodontists had the highest knowledge score, while general dentists and oral and maxillofacial surgeons had the lowest knowledge score.

Conclusion: It was determined that general dentists considered controlled extraction of PFMs as a treatment method but preferred to refer the patient to pediatric dentists or orthodontists at the point of application. Pediatric dentists and orthodontists had higher knowledge scores regarding controlled extraction. The ratio of dentists who thought that the subject of controlled extraction was not sufficiently covered in undergraduate or graduate courses and that there was a lack of guideline on this subject was quite high.

Keywords: Permanent first molar, controlled extraction, pediatric dentist, survey

INTRODUCTION

The eruption of permanent first molars (PFM) is the first step in the transition to permanent dentition and guides the eruption of subsequent teeth.[1] Although PFM teeth play a key role in occlusion, they have been reported to be the most caries-prone teeth in permanent dentition.[2-4] Other genetic factors such as their anatomical structure including deep pits and fissures, incomplete tooth brushing habits of children due to the age range in which this tooth erupts, neglect of this tooth by parents thinking that it is a deciduous tooth, eruption before mineralization is completed, long-term adjacent to deciduous teeth, its position in the infraocclusion at the posterior of the arch and molar incisor hypomineralization (MIH) cause these teeth to become susceptible to caries.[5-7] It is a very challenging process to treat these teeth that decay at an early age, especially before the root development is completed. In PFM teeth with excessive loss of, crown destruction extraction may be the last treatment option when restoration becomes impossible.[8-10] However, uncontrolled extractions performed on PFM teeth during the growth and development period may cause mesial or distal contact tooth to fall into the extraction cavity, displace and elongate in the opposite posterior direction, and unilateral extractions may lead to midline deviation, skeletal and dental asymmetry, unilateral chewing habits and consequently temporomandibular joint disorders.[11]

At the right time and in the appropriate occlusion, the treatment applied for the formation of a new and near-ideal occlusion in the future by extracting the contralateral PFM tooth adjacent to the PFM tooth and/or the contralateral PFM tooth in the same arch; Demir et al.[12] called it 'controlled

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extraction', Dastori et al.[13] called it 'enforced extractions of first permanent molars or EExFPMs', Royal College of Surgeons of England Guideline[14] called it 'extraction of permanent molars with poor prognosis'. We considered this procedure as a general title 'controlled extraction of poor prognosis permanent first molars or CExpPFS'. In controlled PFM extractions, the goal is to move the permanent second molars (PSM) mesial in parallel and to ensure that they make contact with the second premolar.[15] Controlled extraction guidelines may recommend the extraction decision for other PFM teeth with or without caries in appropriate cases.[12] Since it is not possible for every dentist to access expert consultation in clinical routine, dentists may hesitate when making extraction decisions. In addition, the accumulation of data on this subject in the literature is based on retrospective studies and there may be differences of opinion today. The aim of this survey study is to raise awareness of the issue by evaluating the level of knowledge and clinical approaches of general dentists and specialist dentists regarding the controlled extraction of young permanent PFM with poor prognosis in children.

METHODS

This study was conducted within the scope of Dicle University Faculty of Dentistry Ethics Committee (Date: 26.04.2023, Decision No: 2023-17). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. A 23-question survey was designed to evaluate the level of knowledge and clinical approaches of dentists in Turkiye regarding the CExpPFM teeth. The survey included 8 questions on demographic data and 14 questions on the criteria and indications for CExpPFM teeth as well as their knowledge requirements about these extractions. The survey form was modeled after questions that have been previously administered on a similar topic and proven to be valid.[12,13,16,17] We aimed to evaluate the specialty knowledge scores of the participating dentists through questions[9,10,12-16,18,19] regarding the level of knowledge in the present study. National clinical guidelines for the extraction of PMS in children were used as a guide for this assessment.[10,14,18,19] In the present study was conducted online via Google Form among dentists in the fields of pediatric dentistry, orthodontics, oral and maxillofacial surgery, other specialties and general dentists working in dental faculties, oral and dental health hospitals, private dental clinics in Turkiye. Incomplete survey and participants whose consent was not obtained at the beginning of the survey were not included in the study. The questions in the survey form consisted of multiple-choice questions and questions that could be answered by marking on checkboxes.

Statistical Analysis

Data evaluation: The data obtained in this study were analyzed with the licensed IBM SPSS version 21 (IBM SPSS Statistics, Armonk, NY) package program. Descriptive statistics related to the parameters were evaluated. Shapiro Wilk's' and/or Kolmogorov Smirnov tests were used to investigate whether the variables were from normal distribution due to the number of units. While interpreting the results, 0.05 was used as the significance level; in case of $p<0.05$, it is known that the variables do not come from a normal distribution, and in case of $p>0.05$, it is known that the variables come from a normal distribution. When examining the differences between the groups, Kruskal-Wallis H test was used in case the variables did not come from a normal distribution. In case of significant differences in the Kruskal-Wallis H test, post-Hoc multiple comparison test was used to compare the groups with differences. While interpreting the results, 0.05 was used as the significance level and it was stated that there was a significant difference in case of $p<0.05$ and there was no significant difference in case of $p>0.05$.

RESULTS

Of the 261 survey participants, 57.85% were female and 42.15% were male dentists. Of the participating dentists, 59.39% had a professional experience of 1-5 years, 18.77% had a professional experience of 6-10 years, and 21.84% had a professional experience of 11 years or more. According to their titles; 155 general dentists, 28 specialist dentists, 51 research assistants, 18 assistant professors, 6 associate professors and 3 professors participated in the present study. Of the participants, 156 were general dentists and 105 were specialists. Of the specialists, 48 were working in pediatric dentistry, 11 in orthodontics, 12 in oral and maxillofacial surgery, and 34 in one of the other specialties.

It was stated that 80.08% of the participants were aware of the concept of CExpPFM teeth. 93.1% of the participants said that they considered CExpPFM teeth in the ideal age range as a treatment method. The percentage of physicians who thought that the cavity created by the controlled extraction of young PFM teeth at the ideal age range could be closed by the PSM tooth was 87.36%. The ratio of dentists who applied controlled extraction of PFM teeth as a treatment in children was 52.11%. In the multiple-choice question 12, which asks about the factors that determine the indication when deciding to extract a PFM tooth. (-age -cooperation -oral hygiene and DMFT -conservative, restorative, excessive crown destruction such that prosthetic treatments cannot be applied - periodontal or endodontic problems - presence of apical pathology - severity of dental pain - presence of molar-incisor hypomineralization - socioeconomic status - tooth alignment or crowding - planned orthodontic treatment - presence and stage of development of PSM and permanent third molars (PTM) - existing malocclusion - all), 45.38% of the respondents chose 'All' and answered this question correctly according to the controlled extraction guidelines of PFM teeth.[14,19] Dentists stated that the most important factors affecting the indications for PFM extraction in children were the age of the patient and the presence of excessive crown destruction to the extent that conservative, restorative and prosthetic treatments could not be applied later on. When we asked the participants about the ideal timing for controlled extraction of PFMs, 76.25% of the dentists indicated that this period is between 8-10 years of age. However, according to the Nolla classification,[1] the ideal extraction time of PFM teeth, when the 6th stage is over and the 7th stage is not yet completed, was marked at a low rate by non-specialized dentists (26.92%) except pediatric dentists and orthodontists. Except for stage 7, the other stages were marked by 51.48%. The question 'In which jaw do you think the appropriate age interval timing is more critical when performing controlled tooth extraction in PFMs?' was answered by 79.31% of the participants as mandible. 73.56% of the

respondents reported that the presence of the DBA tooth germ influenced their decision to plan controlled extraction. 53.26% of the physicians stated that they had an opinion about compensation and balancing extractions. 50.57% of the participants reported that in a case in which they planned a compensation extraction; the presence of the tooth to be compensated in the maxilla positively affected the extraction decision. In the multiple-choice question 18, in which we asked what influenced the extraction decisions when planning the compensation and balancing extractions of PFM teeth in the presence of favorable conditions (a. The prognosis of the tooth included in the compensation or balancing extraction affects my extraction decision. b. Whether the tooth to be extracted is in the mandible or maxilla affects my decision to perform compensation extraction. c. The presence/absence of crowding affects my decision to perform balancing extraction. d. The presence of class 3 malocclusion affects my decision to perform compensation and balancing extraction. e. All). 63.11% of the dentists marked on the 'all' option. In the 20th question regarding the indication options, we presented to the dentists in the presence of severe caries and excessive loss of material in only one of the PFMs of a healthy 9-year-old male patient, the treatment attitude of the dentists, except for orthodontists and pediatric dentist, in PFM teeth was "consulting an orthodontist or pediatric dentist". Most of the dentists participating in the study think that the subject of controlled extraction of PFM teeth is not sufficiently covered in undergraduate or graduate courses. Almost all of the dentists stated that they needed more information about controlled extraction of PFM teeth (Table 1).

The mean knowledge score was 6.08 (out of 9) in terms of the answers given to the questions regarding the level of knowledge (Table 2). There is a statistically significant difference between the specialties of dentists in Turkiye in terms of knowledge score on PFM controlled extraction ($p<0.05$). The knowledge score of non-specialists was significantly lower than all specialists. Among the specialists, pediatric dentists and orthodontists have the highest knowledge score and oral and maxillofacial surgeons have the lowest knowledge score (Table 3).

DISCUSSION

When the literature on controlled extraction of PFMs was reviewed, it was observed that there were not enough survey studies with this scope and variety of questions and there were very few studies evaluating the knowledge levels of dentists regarding controlled extraction guidelines.[12,13,16] Therefore, it is thought that the results of the present survey study will contribute to the literature.

There is no guideline on controlled extraction protocol by The American Academy of Pediatric Dentistry (AAPD) yet.[13] The Royal College of Surgeons of England published their guidelines on controlled extraction in 2009 and updated them in 2014.[14] According to the present survey results, the treatment approach to controlled extraction showed great differences between general and specialist dentists. In Turkiye, there are no guidelines yet on whether this condition should be managed by a pediatric dentistry specialist or a general dentist.

Eighty percent of the dentists surveyed stated that they had knowledge about controlled extraction. In the survey conducted by Dastouri et al.[13] in the United Arab Emirates, this rate was 68.9%. It was thought that the participation of more specialist dentists (40%) in the present survey made a difference compared to similar survey results. In the survey of Dastouri et al.,[13] 74.2% of the dentists reported that they did not practice controlled tooth extraction in the clinic. In the present survey, 50.2% of the dentists practiced controlled extraction. Similar to the study conducted in the United Arab Emirates, it was observed that pediatric dentists practiced controlled extraction more frequently.

Dastouri et al.,[13] asked whether the age of the child affected the decision to indicate extraction of a PFM tooth and 62.8% answered 'Yes'. Demir et al.[12] reported that 93.7% of dentists stated that patient age affected their treatment choices. According to the present survey, the most important factors affecting the indication for extraction by dentists were 'patient age' and the presence of 'crown destruction so severe that conservative, restorative and prosthetic treatments of PFM cannot be applied', while the least influential factors were 'severity of dental pain' and 'presence of MIH'. One of the important factors affecting the incidence of caries in PFM teeth is MIH, which has a global prevalence of approximately 13%.[20] There are guidelines indicating that extraction of PFM teeth severely affected by MIH may be a good treatment alternative.[10,14,19,21] In question 12 of the survey, 26.15% of the physicians stated that the presence or absence of MIH in this tooth would affect their indications when deciding to extract a PFM tooth.

In a meta-analysis, 39 maxillary PFM teeth extracted at the ideal time had 72% excellent gap closure and 80% better spontaneous closure in upper jaw extractions performed at 8-10.5 years of age In a pooled analysis of 489 mandibular PFM teeth, it was reported that 48% had good to excellent gap closure when extracted at the ideal stage and 50% better spontaneous closure was obtained in mandibular extractions performed at 8-10.5 years of age.[18] In the survey of Dastouri et al.,[13] 61% of dentists knew the ideal extraction timing. In the present survey, 87.6% of dentists reported that the appropriate age range for CExpPFMs is 8-10.5 years. However, according to the Nolla classification[1] the ideal extraction time of PFM teeth, when stage 6 is over and stage 7 is not yet completed, was marked by a very low percentage of general dentists (26.92%), except for pediatric dentists and orthodontists.

Gill et al.[22] reported that with controlled extraction of PFM teeth at the appropriate time, the PFM tooth can move to mesial and establish an ideal contact relationship with the second premolar. Farrokhi et al.[16] reported that all pediatric dentists and 90% of orthodontists thought that when PFM teeth were extracted according to an appropriate treatment plan, they could be replaced by PFM teeth. Similarly, in the present survey, all pediatric dentists and 91.5% of orthodontists made markings. It was concluded that the age range that pediatric dentists and orthodontists are interested in, the chance to follow the patients, the fact that their knowledge about the eruption times and development of teeth remains up to date, and the inclusion of this subject in their specialty training are effective in this result.

Teo et al.[23] reported that the mesial angulation of the PFM teeth and the presence of a PTM were more influential on

Table 1. Frequency distribution table of the answers given to the survey questions according to specialization areas responses to the (survey percentages of "yes" answers are given)

		Pediatric dentistry		Orthodontics		Oral and maxillofacial surgery		Other specialty		General dentistry		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Are you familiar with the concept of CExpPFM?	Yes	46	95.83	10	90.91	11	91.67	28	82.35	114	73.08	209	80.08
	No	2	4.17	1	9.09	1	8.33	6	17.65	42	26.92	52	19.92
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you consider CExpPFM at the ideal age as a treatment?	Yes	48	100	11	100	11	91.67	32	94.12	141	90.38	243	93.1
	No	0	0	0	0	1	8.33	2	5.88	15	9.62	18	6.9
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you think that the spacecreated by CExpPFM teeth in the ideal age range can be closed by the PSM teeth?	Yes	48	100	10	90.91	10	83.33	31	91.18	129	82.69	228	87.36
	No	0	0	1	9.09	2	16.67	3	8.82	27	17.31	33	12.64
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Have you used CExpPFM teeth in children as a treatment?	Yes	43	89.58	5	45.45	1	8.33	8	23.53	79	50.64	136	52.11
	No	5	10.42	6	54.55	11	91.67	26	76.47	77	49.36	125	47.89
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Which of the following influences your indication when deciding to extract a PFM tooth in children (Multiple selection allowed)?	Other answers	10	20.83	5	45.45	7	58.33	16	47.06	102	65.38	140	53.64
	All of them	38	79.17	6	54.55	5	41.67	18	52.94	54	34.62	121	46.36
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Which of the following do you think is the appropriate age range for controlled extractionof PFMs?	<8	2	4.17	1	9.09	4	33.33	4	11.76	27	17.31	38	14.56
	8-10.5	46	95.83	10	90.91	8	66.67	28	82.35	107	68.59	199	76.25
	>11	0	0	0	0	0	0	2	5.88	22	14.1	24	9.2
	Total	48	100	11	100	12	100	34	100	156	100	261	100
According to the Nolla classification you see below, which stage of furcation development of the PFM tooth would you consider to be the ideal extraction time for PFM teeth?	Other stages	9	18.75	3	27.27	5	41.67	23	67.65	114	73.08	154	59
	6th and 7th stages	39	81.25	8	72.73	7	58.33	11	32.35	42	26.92	107	41
	Total	48	100	11	100	12	100	34	100	156	100	261	100
In which jaw do you think the timing of the appropriate age range is more critical when performing CExpPFMs?	Mandibula	40	83.33	9	81.82	9	75	30	88.24	119	76.28	207	79.31
	Maxilla	8	16.67	2	18.18	3	25	4	11.76	37	23.72	54	20.69
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Does the presence of a PTM tooth germ affect your decision to plan CExpPFM teeth?	Yes	43	89.58	10	90.91	6	50	28	82.35	105	67.31	192	73.56
	No	5	10.42	1	9.09	6	50	6	17.65	51	32.69	69	26.44
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you have any idea about compensation (opposite arch PFM extraction) and balance (symmetrical arch PFM extraction) extractions in controlled tooth extraction?	Yes	43	89.58	8	72.73	9	75	14	41.18	65	41.67	139	53.26
	No	5	10.42	3	27.27	3	25	20	58.82	91	58.33	122	46.74
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Compensation and balancing of PFM teeth will be performed if there are suitable conditions. Which of the following will influence your decision (Multiple choices allowed)?	Other answers	6	12.5	4	36.36	6	50	11	32.35	76	48.72	103	39.46
	All of them	42	87.5	7	63.64	6	50	23	67.65	80	51.28	158	60.54
	Total	48	100	11	100	12	100	34	100	156	100	261	100
In a case where you are planning to perform a compensation extraction (extraction of the opposite arch PFM tooth); in which jaw will the tooth you will extract for compensation be located, which will positively affect your compensation extraction decision?	Mandibula	19	39.58	5	45.45	4	33.33	15	44.12	86	55.13	129	49.43
	Maxilla	29	60.42	6	54.55	8	66.67	19	55.88	70	44.87	132	50.57
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Which of the following would be your extraction decision for a healthy 9-year-old male patient with severe caries and excessive loss of material in only one of the PFMs?	I'll consult an orthodontist or a pediatric dentist	5	10.42	3	27.27	7	58.33	19	55.88	73	46.79	107	41
	I plan endodontic and restorative treatment of a PFM tooth with severe caries when other PFMs are healthy	16	33.33	2	18.18	2	16.67	11	32.35	54	34.62	85	32.57
	I only plan to extract the PFM tooth with severe decay	7	14.58	2	18.18	2	16.67	2	5.88	19	12.18	32	12.26
	With a PFM tooth with severe caries, I also plan compensation and balancing extractions in the presence of favorable conditions	20	41.67	4	36.36	1	8.33	2	5.88	10	6.41	37	14.18
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you think that the subject of CExpPFM teeth is sufficiently covered in your undergraduate or graduate dentistry courses?	Yes	17	35.42	3	27.27	1	8.33	3	8.82	22	14.1	46	17.62
	No	31	64.58	8	72.73	11	91.67	31	91.18	134	85.9	215	82.38
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you think there is a lack of guideline on CExpPFM teeth?	Yes	40	83.33	8	72.73	9	75	29	85.29	120	76.92	206	78.93
	No	8	16.67	3	27.27	3	25	5	14.71	36	23.08	55	21.07
	Total	48	100	11	100	12	100	34	100	156	100	261	100
Do you think you need more information about CExpPFM teeth?	Yes	42	87.5	10	90.91	11	91.67	34	100	145	92.95	242	92.72
	No	6	12.5	1	9.09	1	8.33	0	0	11	7.05	19	7.28
	Total	48	100	11	100	12	100	34	100	156	100	261	100

CExpPFM: Controlled extraction of permanent first molars with poor prognosis, PFM: Permanent first molars, PSM: Permanent second molars, PTM: Permanent third molars

Table 2. Frequency distribution table regarding the level of knowledge of dentists in Turkiye about CExpPFM

	n	Mean	Median	Min	Max	SD
Knowledge level of dentists in Turkiye on CExpPFMs	261	6.08	6	2	9	1.71

CExpPFM: Controlled extraction of permanent first molars with poor prognosis, Min: Minimum, Max: Maximum, SD: Standard deviation

Table 3. Differences in the level of knowledge of dentists in Turkiye about CExpPFM according to their specialty

	The level of knowledge of dentists in Turkiye on CExpPFMs						Kruskal-Wallis H test		
	n	Mean	Median	Min	Max	SD	Mean rank	H	p
Pediatric dentistry	48	7.77	8	5	9	0.97	206.79		
Orthodontics	11	7	7	4	9	1.61	170.45		
Oral and maxillofacial surgery	12	5.83	6	2	8	1.9	117.33	78.322	0.001
Other specialty	34	6.47	6.5	3	9	1.4	143.43		
General dentistry	156	5.43	5	2	9	1.54	101.73		
Total	261	6.08	6	2	9	1.71	5-4 5-2 5-1 4-1 3-1		

CExpPFM: Controlled extraction of permanent first molars with poor prognosis, Min: Minimum, Max: Maximum, SD: Standard deviation

the spontaneous closure of the extraction cavity than the developmental stage of the PFM tooth. The force generated by the developing PTM tooth may help the PFM tooth to close the extraction cavity.[22] In the survey of Demir et al.,[12] 64.4% of the respondents checked the presence of a PTM tooth when deciding on controlled extraction. In the present survey, this rate was similar with 73.56%.

In the study by Farrokhi et al.,[16] 70% of pediatric dentists and less than 50% of other specialists answered the question "If appropriate conditions are present, balancing and compensatory extraction of PFM teeth can be performed to maintain occlusal relationship and symmetrical dental arch. In present survey, 89.6% of pediatric dentists and 41.7% of general dentists stated that they had an opinion.

In Farrokhi et al.'s[16] survey, all orthodontists and pediatric dentist marked that the overall and long-term prognosis of the PFM teeth, and the type of underlying malocclusion were important in deciding whether to perform compensatory or compensatory extraction of PFMs. In present survey, most of the dentists stated that the prognosis of the tooth and the indications for Class III malocclusion were important.

Teo et al.[23] stated that extraction timing alone is not sufficient for gap closure, especially in the lower jaw. Hallet et al.[24] found that in patients with Angle class I skeletal bite and buccal segment crowding, the most favorable closure occurred in the lower jaw. In another study, it was reported that following the extraction of the PFM tooth in the maxilla, the PSM tooth achieved a good occlusal position, while the occlusal result in the lower jaw was more variable and less predictable.[25] Therefore, the timing of extraction of PFM teeth becomes more important in the mandible.[26] In present study, it was determined that the majority of dentists answered this question correctly according to the controlled extraction guidelines.

According to Demir et al.,[12] 96% of physicians think that "The PFM of the maxilla is over-erupted" after the extraction of the PFM of the mandibula. Farrokhi et al.[16] reported that 70% of pediatric dentists, 30% of orthodontists, and 12.5% of oral and maxillofacial surgeons stated that if mandatory extraction of the mandibular PFM tooth is required, compensation extraction of the maxillar PFM tooth should be performed. In present survey, half of the dentists reported that the fact that the tooth to be extracted for compensation was in the maxilla positively affected the decision for compensation extraction.

Taylor et al.[17] reported that 30.2% of general dentists were in favor of consulting pediatric dentists for treatment planning of PFM teeth with poor prognosis. Dastouri et al.,[13] 89.9% said they would consult/refer to other specialists. In present survey, this rate was 46.76% in general dentists and 55.88% in oral and maxillofacial surgeons.

As a result of the statistical analysis of in present survey study, the mean knowledge score was determined as 6.08 (out of 9). In the study by Farrokhi et al.,[16] in which they determined the knowledge level scores among dental specialists only, pediatric dentist had the highest knowledge level and endodontists, and maxillofacial surgeons had the lowest knowledge level. In Turkiye, knowledge scores were highest among pediatric dentist and orthodontists and lowest among general dentists and oral and maxillofacial surgeons.

The question "Do you think you need more information about CExpPFM teeth?" was answered yes by almost all of the physicians. Demir et al.[12] received 'yes' answer from 87.1% of the participants in their similar question. As a result of these data, it was observed that the subject of controlled extraction should be included more in the undergraduate and postgraduate education of dentists. However, respondents did not show sufficient interest in the survey and refrained from answering the survey, which resulted in a lower than targeted sample size in some specialization areas.

CONCLUSION

It was observed that pediatric dentists and orthodontists are more likely to apply the application protocol and have more knowledge on this subject. It was determined that there is not yet a consensus on compensation and balancing extraction, which the guidelines recommend in certain scenarios. It was seen that a reliable, precise and evidence-based template should be established on this subject.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission Dicle University Faculty of Dentistry Ethics Committee (Date: 26.04.2023, Decision No: 2023-17).

Informed Consent

Informed consent was obtained from all patients participating in the study.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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